Teach ’em to fish: transitioning from remediation to inspiration - inspiring adults to teach mathematics

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Background
In the US, developmental (or remedial) education is a major component of formal institutionally-directed adult education. The National Association of Developmental Educators (NADE) offers an official definition:

Developmental education is a field of practice and research within higher education with a theoretical foundation in developmental psychology and learning theory. It promotes the cognitive and affective growth of all postsecondary learners at all levels of the learning continuum. Developmental education is sensitive and responsive to the individual differences and special needs among learners (NADE, 2008).

Each year approximately 30% of the new students entering US public higher education will need some form of remedial or developmental education and, in my home state of Texas, each year, 41% of all new college students are under prepared (THECB, 2006). These rates have remained virtually unchanged over the past decade even with mandatory testing programs, coordinated transition programs with feeder secondary schools, and elevated entrance standards. Clearly, recent emphasis on high-stakes testing and teacher-accountability does not solve the problem of under-preparedness. After all, Texas is among those states that have been using such testing for over two decades, yet this state alone will have over 200,000 new college students this year who are unable to perform basic skills at levels needed for success in higher education (THECB, 2006). Moreover, if the percentage of first-year college students requiring remediation remains roughly the same, the magnitude of the problem will grow as the population, and hence the overall number of new students, continues to climb.

Furthermore, since most community colleges and many other institutions of higher education maintain an ‘open enrollment’ policy, it is unlikely that the need for developmental education will decline any time soon. On the contrary, with increasing globalization and the steady loss of American jobs, especially in the manufacturing and service industries, many under-prepared adults are enrolling in higher education in order to expand their employment opportunities. So, although it is conceivable that the number of compulsory school graduates with academic deficiencies might eventually be reduced, there is a growing population of adult students (including a significant immigrant population) whose educational backgrounds will never match contemporary curriculum designs. In fact, a Texas Higher Education Coordinating Board (THECB) report covering a six-year period ending in 2005 revealed that developmental semester hours in Texas had increased by nearly 20% (THECB, 2006). For the foreseeable future, developmental education will continue to be a necessity in US higher education.

Related literature
The direction of this study sprang from research needs as initially identified by leading
researchers in the field of adult developmental education. Boylan (2000) outlined the many recent gains in developmental education but emphasized that much more knowledge is needed, especially pertaining to developmental students themselves. For example, we have learned one thing ‘that typifies them is that they are over-represented among the poor and that many have a past history of academic difficulty’ (pp.23). In particular, the THECB report reveals that Hispanic and African-American students are overrepresented among those students who are under-prepared for college work in Texas. Statewide, 41% of all students transitioning from secondary school to college are in need of remediation – but this group is comprised of 54% of all the Hispanic students, 54% of the African-American students, and 32% of the White students. Furthermore, once in college, minorities exhibit persistence rates that fall far below those of the general student population. But, in addition to such demographic information, there is a need for more knowledge of developmental students’ characteristics and experiences, as well as a greater understanding of the implications of such for instructional practice. For instance, we need ‘to learn more about the impact of faculty attitudes on the performance of weaker students’ (pp.23). Mathematics, especially, is the subject for many students that brings the issues of self-esteem and confidence to the forefront. We need to know if educators are (consciously or unconsciously) exhibiting attitudes and behaviors which serve as obstacles and barriers – or propellants and bridges – for adult developmental mathematics students in their efforts to navigate the waters of higher education.

As adult educators we are often encouraged by even marginal improvements, though we yearn for more dramatic success. It is an understatement to say we are delighted when a developmental student persists to graduation. It is even more rewarding when a developmental student decides to major in mathematics or a mathematics-related field. But best is when a developmental mathematics student graduates university and decides to become a mathematics educator. It is reminiscent of the well-known proverb, ‘Give a man a fish – you have fed him for today; teach a man to fish – and you have fed him for a lifetime’. It is particularly gratifying because it represents the perpetuation of successful pedagogy beyond the immediate. For critical educators who work to foster change, it is imperative that we not only teach content, mathematics in this instance, but that we foster life-long learning in others. I can imagine no greater reward as a teacher than knowing not only have I successfully taught my own students, but that I, through them, will teach others.

Statement of purpose

The purpose of this ongoing study is to gain a better understanding of the experiences of adult developmental mathematics students who, after successful completion of their developmental courses, determined to become teachers. What characterizes the experiences of those individuals who, despite their own struggles with mathematics, resolved to become mathematics educators? What factors, inside or outside the classroom, supported their decisions to pursue careers as mathematics teachers?

Research design

In order to investigate the experiences of these adult learners, a qualitative design was chosen (Merriam and Caffarella, 1999) with narrative analysis as the means for exploring their experiences and for enhancing our understanding of them (Gee, 1999). A purposeful sampling was indicated. A call for participants was posted through various listservs and teacher-preparation programs, as well as by word-of-mouth. Thus, snowball sampling was used to find educators with a developmental background who were interested in participating. Participants are former developmental mathematics students who have
successfully completed developmental mathematics coursework and are presently engaged as either full-time or preservice mathematics teachers.

**Findings**

Boylan and Eaton (2002, pp.11) contend that students drop out of an institution for a variety of reasons, but by using a ‘cultural lens to examine their experience, we may find that the reasons are grounded in a sociocultural context as well as [in] psychological or academic [ones]’. Findings also indicate that the reasons students persist in their educational endeavors, are also grounded in the same three contexts – sociocultural, academic, and psychological. Moreover, in a study of the sources of struggle that adults confront in academic environments Quinnan (1997) assembled the responses into five categories:

1) Economic barriers  
2) Internal family stressors  
3) Student-to-student tensions  
4) Student-teacher strains  
5) Organizational obstacles

Against this broad backdrop I will explore elements of two of the compelling stories thus far obtained.

**Meet Joe**

Joe is a 34 year old Hispanic male who was born in the US. He is bilingual with English as his first language. He married at age 18 while still in secondary school. Soon thereafter he completed secondary school and took a job in order to support his wife and two children who quickly arrived. He worked as a truck driver, making a decent living wage, for 11 years, and then an accident permanently damaged Joe’s knees. Joe was no longer able to drive a truck since the job involved loading and unloading heavy cargo. He would have to get a new job – one that paid enough to support his family – and that would most likely require training (i.e. education). And, in the US, obtaining a formal education beyond secondary school requires money.

**Meet Denise**

A few years ago, at age 30, Denise found herself making some tough decisions. After 12 years of a difficult marriage she was going through a bitter divorce from a ‘deadbeat husband’ who would provide no assistance – financial or otherwise – with the upbringing of their 7 year old daughter. Denise was determined, however, that these major life changes would include enrollment at the local community college – because she needed to qualify for better jobs and, perhaps more importantly, she had been denied the opportunity for college for years while catering to ‘Mr. Deadbeat’s laziness, failed pipedreams, and male-insecurities’. It was her turn now. However, like Joe, Denise needed money. She would have to work two jobs in order to pay for living expenses, childcare, and tuition. Money was very tight, her academic skills a bit rusty (put mildly), and she was scared.

**Economic barriers**

Fortunately for Joe, he qualified for assistance through the Texas Department of Assistive and Rehabilitative Services (DARS). His assigned DARS counselor and his doctor worked to insure Joe qualified for enough funding to cover his new educational expenses. DARS funds covered tuition, books, living expenses, transportation, and provided a generous allowance for school supplies. Thus, the potential economic barrier was averted. Joe now
feels that his devastating injury was actually a blessing in disguise.

Many developmental students are required to secure loans, work multiple jobs, and, often, simply do without needed materials. Often these students are unable to avail themselves of an institution’s academic support services such as group study sessions, peer tutoring, and supplemental instruction – as well as computer labs and library services.

Unfortunately for Denise, money continued to be a major concern. Grant money she qualified for, because of her low-income status, fell far short of covering expenses. She had to take out loans to cover living expenses, since her minimum-wage job did not provide enough money for necessities.

**Internal family stressors**

Again, Joe was fortunate. Both his immediate and extended family rejoiced at his opportunity and fully supported his efforts. When his wife needed help with the children and Joe wanted to attend a supplemental instruction meeting, family members stepped in to help. Whenever he needed, extended family members and friends stepped up to assist.

Denise, on the other hand, had a very religious family who believed her divorce was morally wrong. They isolated her and offered little support of any kind. In fact, she felt that they sided with her ex-husband and wanted to force her into ‘dropping out of school and going back to a life of complete misery’. If her daughter was sick, she had to miss night classes, having no one to babysit. As she put it, ‘it was the darkest time in my life. My own family turned their back on me in the name of religion’.

**Student-to-student tensions**

Neither Joe nor Denise had any serious problems with student-to-student relationships. Both got along well with their peers, many of whom were slightly younger, and began to discover the joy of teaching through the learning experiences they shared with their fellow students.

**Student-teacher strains**

Once Joe’s financial problems had been solved he encountered very few other significant struggles in his path to becoming a certified mathematics teacher. However, on two separate occasions – late in his educational career, student-teacher relationships became a source of tension. By then Joe had become more confident in his own abilities and learning style and he had come to expect a certain quality of instruction from his teachers. When he felt short-changed, he confidently met the problems head on – once opening new lines of communication with his professor who moved to accommodate his perceived need and once resolving to drop the course to take it at some later date with a different professor.

Denise, however, hit this obstacle on her first day of classes. At 30 years old, she had worked full-time since secondary school, except for a few months when her daughter was born. She was going through an emotional and painful time. She felt fragile, but determined to overcome for her daughter’s sake. After all those years she was ‘terrified of going to a pre-algebra class’. She was insecure, but knew that she was smart and a very quick learner. So it was with mixed emotions she walked into the nearly full developmental mathematics classroom and took one of the few chairs left available—on the front row.

The developmental course was designed to be self-paced using an adaptable syllabus,
audio-visual materials, and a testing center with flexible schedule. Recognizing that she might be able to reduce the cost of tuition if she could finish a two-course sequence in one semester, she raised her hand to ask. The teacher looked down at her 'with disdain akin to disgust in her eyes and voice'. Her new teacher smirked and said, 'You don’t need to worry about that. You won’t finish early – if you finish at all'. Denise felt like she 'had been slapped'. When class was dismissed and she left the room in a humiliated daze.

Since the mathematics class was the last class of the day, Denise went straight home determined that she wouldn’t go back. Denise’s brown eyes filled with tears at the memory. But putting her daughter to bed in their tiny apartment that night, she gained new resolve and decided not to give up. But she would not stay in that class. The next morning after dropping her daughter at school, Denise went to the registrar’s office. She asked how to change sections and was told that all sections were full. The young woman then leaned forward and half-whispered, ‘but if you get another teacher to let you in, they’ll let you change’. Denise asked the young woman who might be a nicest and accommodating teacher; the fellow student gave the name of one whose section would fit her busy schedule.

It took some pleading, but the instructor signed the form. According to Denise, that was 'probably the luckiest day of [her] life'. The instructor was warm and encouraging showing genuine concern for her students’ learning and their lives. Her kindness and patience made Denise work ‘harder than [she’d] ever worked for anyone in [her] life’. Denise did finish early after all – the experience changed her life, gave her confidence, and made her want to ‘save other’s from the fate [she] almost suffered’.

**Organizational obstacles**

Critical theorists have long pointed out that real access to education, as well as to equality and justice, is constrained by dominant ideologies which place the interests of a group above that of the individual (Freire, 1990; Horton, 1990; Giroux, 1992; Habermas, 1970). Quinnan (1997, pp.14) reiterates Freire’s call for educators to ‘confront, resist, and overcome the dominant ideology (status quo) through heightened consciousness of the many ways oppression is operationalized through institutional practices’. When administrators, teachers, and service organizations, actually do facilitate access for marginalized students, then there is the very real possibility of success via developmental education.

In Joe’s case it was not the university that facilitated access to the benefits that it provided. Rather, it was a separate state educational/training institution. There, a devoted counselor not only helped Joe get on the right career path, but she also facilitated his surmounting the economic barriers he faced so as to secure access to the institutional services he needed.

Denise was able to find friendship, assistance, and support from individual members of the higher education institution. It was not so much organizational policy as it was individual adult educators, sensitive and responsive to a student in need and in distress. Such intangibles playing out through our roles as adult educators account for some of the more poignant stories told to me for this study.

Shortly after it was determined that Joe qualified for financial assistance and long before he enrolled at the university, his counselor played, perhaps, an even more significant role in his success. The counselor arranged for Joe to take an aptitude test which revealed his propensity for mathematics and which also ruled out other options Joe had been
considering. But a propensity is not an expertise. College entrance exams confirmed that Joe’s mathematics skills did not meet the minimums required for college-level courses. It would be necessary for Joe to enroll in a developmental mathematics course.

Similarly, placement testing for Denise indicated the necessity for her to take a developmental mathematics course. As with all 9 respondents interviewed so far for this study, both Joe and Denise were happy with their placements. A developmental course costs the same as any other college course, yet it generates no college credit. Even so, they understood that their dormant skills were weak and that laying a proper foundation for future success was of primary importance.

Conclusions

The early embracing of the developmental mathematics course by both Joe and Denise was instrumental to their eventual transition from mathematics student to mathematics teacher for several reasons. Henningsen and Stein (1997, pp.527) assert that the ‘prior failures of poor and minority students are due to a lack of opportunities to participate in meaningful and challenging learning experiences, rather than to a lack of abilities or potential’. It was in their developmental mathematics courses that Joe and Denise gained high quality experiences with mathematics that were both meaningful and challenging.

Because they did, in fact, have dormant aptitude with mathematics, the success they experienced within the developmental class increased their sense of self-confidence and self-worth. Especially with adults, improved attitudes and self-efficacy with respect to mathematics has the potential to open up additional lines of communication and opportunities for learning. In particular, with an improved attitude and enhanced self-image an adult is much more likely to engage in informal and self-directed learning projects. And, as Merriam and Cafarella (1999, pp.288) point out, learning on one’s own is ‘the primary mode of learning in adulthood’.

Three factors emerged as most influential in fostering the desire to teach in Joe and Denise:

1) After successfully completing developmental mathematics they were given the opportunity to mentor or tutor other students who struggled with mathematics.

2) They had a developmental mathematics teacher who not only taught the mathematics, but who was inspirational with respect to the subject and who encouraged them to explore the possibility of teaching others.

3) They were encouraged to relate mathematics to other areas in their lives that they enjoyed, such as sports, politics, construction, and economics.

Goleman (1995, pp.89) points out, some attitudes may well be inborn or natural temperaments but, even so, temperaments may be tempered and cultivated by experience. ‘Optimism and hope – like helplessness and despair – can be learned’. He elaborates:

Underlying both is an outlook psychologists call self-efficacy, the belief that one has mastery over the events of one’s life and can meet challenges as they come up. Developing a competency of any kind strengthens the sense of self-efficacy, making a person more willing to take risks and seek out more demanding challenges. And surmounting those challenges, in turn, increases the sense of self-efficacy. This attitude makes people more likely to make the best use of whatever skills they may have—or to do what it takes to develop them. (pp.89-90)

It is especially clear to those who teach mathematics that success breeds success. And for
Denise and Joe, the success extended to a burning desire to excel at teaching others. Today, Denise holds a Ph.D. in mathematics education at a major university and Joe, completing his student-teaching, will assume his first post as a full-time secondary mathematics teacher this fall. Both have learned to fish.

References


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